LBT01A-KIT



10/100BASE-T Ethernet Extender over VDSL2

Transmits up to 100-/60-Mbps downstream/ upstream data up to 984.2 feet (300 meters) over a single twisted pair of copper wire.

Supports 30-/10-Mbps at distances up to 3280 feet (1 km).



Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746 • www.blackbox.com • info@blackbox.com

FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM)
Electrical Safety Statement
INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

1.1 General

Autodetection — Autodetects 10/100BASE-T and half-/full-duplex, automatic MDI/MDI-X

Coding — Trellis code with 1024 DMT bins

Standards — VDSL Transmission: ITU-T G.993.1/2 SG15Q4 DT standard; LAN Interface: IEEE 802.3/IEEE 802.3u

Connectors — VDSL: (1) RJ-11 for DSL or 3-pin terminal block;
POTS: (1) RJ-11;
LAN Interface: (1) RJ-45

Indicators — (4) LEDs: (1) Power, (1) DSL for VDSL Loop Connection Status, (1) LAN, (1) Master/Slave (M/S)

Temperature Tolerance — 32 to 122° F (0 to 50° C)

Humidity Tolerance — 5 to 95%, noncondensing

Power — 5 VDC, 1 A

Size — 4.7"H x 3.5"W x 1.1"D (12 x 9 x 2.8 cm)

1.2 Data Rates and Distances

Table 1-1. Full-rate 26 AWG line performance at 6 dB.

Downstream Data Rate (Mbps)	Upstream Data Rate (Mbps)	Distance (feet)
100	60	500
98	53	1000
90	44	1250
80	36	1500
70	27	1750
60	18	2000
48	11	2500
39	8	3000
35	3.5	3500
28	0.3	4000

2. Overview

2.1 Introduction

The 10/100BASE-T Ethernet Extender over VDSL2 (very high-bit-rate digital subscriber line) provides a broadband transmission up to 100-/60-Mbps downstream/upstream data rates over a single twisted-pair copper line for point-to-point Ethernet. At 100-/60-Mbps data rates, the extender supports transmission distances up to 984.2 feet (300 meters), and provides a 30-/10-Mbps data rate for a 3280 feet (1 km) connection. Users may also select a fixed data rate or a fixed SNR margin for different copper line ranging.

With plug-and-play features and minimum installation time, you can configure each extender for either CO for central side or RT for remote side by setting DIP switches. The extender conforms to ITU-T G.993.1 and G.993.2 to meet VDSL/VDSL2 and SG15Q4 DMT standards for network requirements. Use a pair of extenders for bandwidth-hungry applications such as LAN-to-LAN connectivity, video streaming, FTTB, and MDU/MTU over a single twisted-pair telephone line.

2.2 Features

- Complies with ITU-T G.993.1, G.993.2 VDSL/VDSL2 and SG15Q4 DMT standards.
- Enables 100-/60-Mbps downstream/upstream speeds for distances up to 984.2 feet (300 meters).
- Supports VDSL2 connections up to 6561.6 feet (2000 meters).
- Supports Annex A, B, or C for internal splitter (option).
- Protects against line surges.
- Has (1) RJ-11 connector or (1) three-pin terminal block for DSL link.
- Includes (1) RJ-11 connector for PHONE or POTS interface.
- Has (1) RJ-45 connector for Ethernet LAN port.
- Includes four LED Indicators.
- Provides (4) DIP switches for configuration settings.
- Supports Trellis coding up to 1024 Discrete Multi-Tone (DMT) bins.
- Uses Auto MDI-X for the 10/100BASE-T Ethernet LAN port.
- Has low-latency for video/voice/data applications.

- You can select Fast and Interleaved modes: Fast mode guarantees a minimum end-to-end latency less than 1 ms. Interleaved mode provides impulse noise protection for any impulse noise with a duration less than 250 us. Interleaved mode has a maximum end-to-end latency of 10 ms. Interleaved mode is the default mode.
- You can also select fixed data rate and fixed SNR margin: Choose fixed SNR margin (9 dB) or fixed target data rate. When fixed SNR margin is selected, the systems will maintain the SNR margin at 9 dB across all available loop length. When fixed target data rate is selected, the system will lock the data rate at 50-/20-Mbps whenever the calculated SNR margin is higher than 9 dB. This will result in the best system stability and is the default mode.

2.3 What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- (2) 10/100BASE-T Ethernet Extenders over VDSL2
- (2) AC-to-DC Power Adapters (5-VDC/1-A) with (1) EU power clip
- (1) CD-ROM containing this user manual in PDF format
- (2) 3-position terminal blocks
- (8) rubber feet
- (8) screws
- (2) RJ-11 cables

2.4 Hardware Description

Figures 2-1 and 2-2 show the extender's front and back panels. Table 2-1 describes its components.

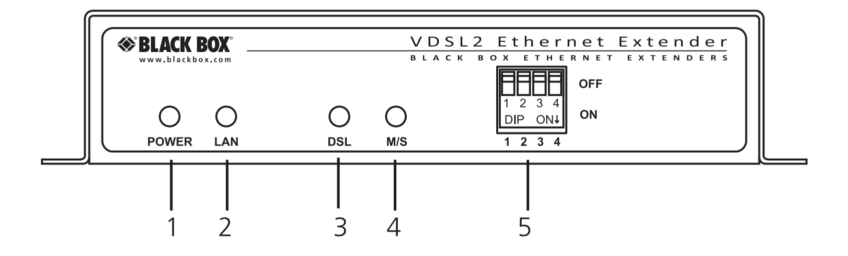


Figure 2-1. Front panel.

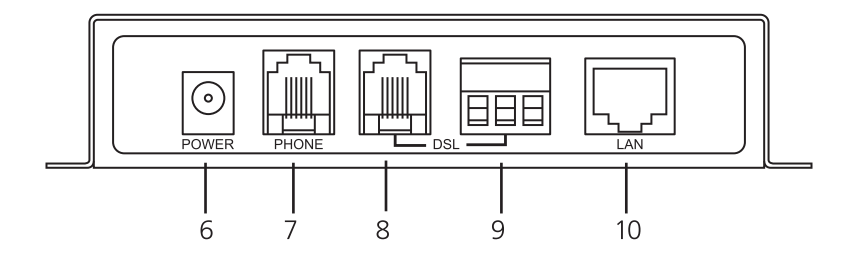


Figure 2-2. Back panel.

Table 2-1. 10/100BASE-T Ethernet Extender components.

Number	Component	Description
1	Power LED	Lights green when power is on
2	LAN LED	Lights green when LAN is connected
		Flashing green when LAN is active
3	DSL LED	Lights green when VDSL is connected
		Flashing green when VDSL is in line handshakking
4	M/S LED	Selects master or slave (OFF = Master; ON = Slave)
5	4-position DIP switch	Used for configuration settings: See Table 3-1
6	Barrel connector	Links to power
7	RJ-11 connector	Links to telephone line
8	RJ-11 connector	Links to VDSL interface
9	3-pin terminal block	Connects to ring/tip/frame ground
10	RJ-45 connector	Connects to LAN interface

2.5 Typical Application

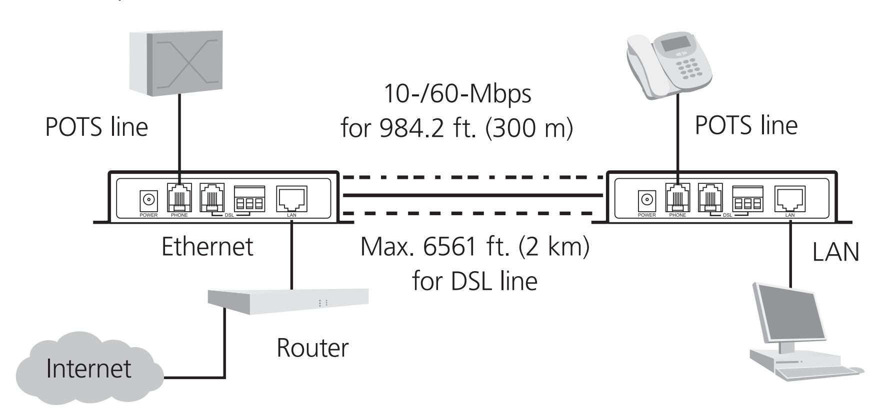


Figure 2-3. Ethernet to Ethernet Bridge Extension over DSL Line.

3. DIP Switch Settings

Table 3-1 describes the DIP switches on the extender.

Table 3-1. DIP switches.

Pin Number: Name	Postion: OFF	Description	Position: ON	Description
1: CO/CPE switch	CO	Extender is configured as Central Office	CPE	Extender is configured as Customer Premise Equipment
2: Mode	Interleaved	Protection for up to 250 ms impulse noises with latency less than 6 ms	Fast	Direct data transmission with latency less than 1 ms
3: Rate limit	50-/20-Mbps	Line rate limited to 50-/ 20-Mbps	Full rate	Provides up to 100-/60-Mbps line rate in a short time
4: Signal-to-noise (SNR) ratio	9 dB	Higher SNR margin (9 dB) will result in less error with more stable VDSL2 link	6 dB	Original and normal channel noise protection with 6 dB SNR

4. LED Indicators

The extender's front panel (see Figure 2-1) has four LED indicators, which are described in Table 4-1.

Table 4-1. LED indicators.

LED	Color	Description
Power	Green ON	Power to the unit is on
LAN	Green ON	Ethernet LAN port is connected
	Flashing green	Ethernet LAN data is active
DSL	Green ON	VDSL2 is connected
	Flashing green	VDSL2 is in line handshaking
Master/Slave (M/S)	Green ON	Extender is set in Slave mode
	OFF	Extender is set in Master mode

Black Box Tech Support: FREE! Live. 24/7.



Great tech support is just 60 seconds away at
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About Black Box

Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 60 seconds or less.

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